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Edward W. Goodman

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

GEERT F.G. DEPOVERE ET AL.

SERIAL NO.: 09/716,907

FILED: November 20, 2000

WATERMARK EMBEDDING AND DETECTION

Atty. Docket

PHN 17,772

GROUP ART UNIT: 2131

EXAMINER: A. Sherkat

Commissioner for Patents
P.O. Box 1450
Alexandria, VA   22313-1450

Sir:

RESPONSE UNDER 37 C.F.R. 1.116

This is in response to the Office Action mailed June 28, 2004, in which the Examiner finally rejected claims 1, 2, 4, 5 and 8-10 under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,933,798 to Linnartz; claims 3 and 7 under 35 U.S.C. 103(a) as being unpatentable over Linnartz in view of U.S. Patent 5,260,648 to Brust; and claim 11 under 35 U.S.C. 103(a) as being unpatentable over Linnartz in view of U.S. Patent 6,510,233 to Nakano.

Applicants traverse the above rejections and offer the following explanation.

The Linnartz patent discloses detecting a watermark embedded in an information signal, in which the embedding of a watermark is described with reference to Fig. 1 therein. In particular, "The arrangement comprises a watermark data signal

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generator 11 which generates a predetermined watermark data signal $w_i(n)$ for each watermark W_i." (col. 2, lines 18-21). As described at col. 2, lines 15-18, "The watermark can be a code which uniquely identifies the owner of the copyright. It can also be a text string or simply a binary coded number. Accordingly, there is a finite set of different watermarks W_i." As should be apparent from examining Fig. 1, the particular watermark Wi used in watermarking the image signal p(n) is pre-selected and applied to the watermark data signal generator 11, which generates the associated watermark data signal which is added to the image signal p(n) in adder 12.

In the subject invention, as claimed in claim 1, a given property of the information signal to be watermarked is analyzed and an actual value of the given property is determined. In addition, different watermarks in a plurality of watermarks are associated with distinct values of the given property. Finally, the watermark from the plurality of watermarks which is associated with the actual value of the property is selected for watermarking the information signal.

Applicants submit that Linnartz neither shows nor suggests analyzing a property of the information signal in order to determine which one of a plurality of watermarks is to be used to watermark the information signal. In fact, Linnartz neither shows nor suggests analyzing an information signal to be watermarked at

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all for any purpose. Rather, Linnartz only applies a single watermark for each image signal $p(n)$.

In the subject invention, over the course of time, the embedded watermark changes, and as such, a plurality of watermarks are used, depending on the actual value of the given property of the information signal.

While in Linnartz "the video signal is assumed to represent a vertical transition from a luminance value 10 to a luminance value 80. The range of luminance values $p(n)$ is assumed to be 0-255.", Applicants submit that there is no analyzing of the image signal $p(n)$ to determine the actual values of the spatial or temporal distribution of luminance values, and the association of different watermarks with distinct values of the spatial or temporal distribution of luminance values, and the selection of the watermark based on the actual value of the spatial or temporal distribution of luminance values of the information signal.

Linnartz, at col. 2, line 39 to col. 3, line 35, describes, as an example, two different watermarks W_1 and W_2, and how the video signal would be differently affected by the different watermarks W_1 and W_2. However, there is no disclosure in Linnartz that these two watermarks form a set of basic watermark patterns, and are combined (as basic watermark patterns) to form an embedded watermark, and that the set of basic watermark patterns being selected from different sets of basic watermark patterns in

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dependence upon the actual value of the property of the information signal.

With regard to claim 5, while Linnartz discloses a watermark detector (with reference to Figs. 2-4) in which a watermarked signal is analyzed, Applicants submit that there is no disclosure or suggestion of "associating different watermarks in a plurality of watermarks with distinct values of said property" nor of "selecting and detecting the watermark from said plurality of watermarks associated with said actual value". In particular, in the analysis of Linnartz, the watermarked signal and a selected one of the watermarks are filtered, and the filtered results are correlated resulting in a correlation amount. As described at col. 6, lines 24-28, "In summary, a watermark embedded in an information signal is detected by correlating said information signal with a plurality of watermarks $W_j(n)$. The respective amounts of correlation $C(i,j)$ are then evaluated to determine the watermark embedded in the signal $x_i(n)$." Hence, Applicants submit that Linnartz neither shows nor suggests "analyzing a given property of the information signal and determining an actual value of said property".

The Brust patent discloses a process and system for rapid analysis of the spectrum of a signal at one or several points of measuring, in which, arguably, the shape of a frequency spectrum of an audio signal is detected. However, Applicants submit that the

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combination of this feature with Linnartz is meaningless, in that neither Brust nor Linnartz disclose or suggest "associating different watermarks in a plurality of watermarks with distinct values of said property" and "selecting the watermark from said plurality of watermarks associated with said actual value for embedding in the information signal".

The Nakano patent discloses an electronic watermark insertion device which includes a watermark detector for detecting whether a watermark to be inserted into a signal has already been inserted into the signal. However, Applicants submit that Nakano does not supply that which is missing from Linnartz, i.e., "associating different watermarks in a plurality of watermarks with distinct values of said property" and "selecting the watermark from said plurality of watermarks associated with said actual value for embedding in the information signal".

In view of the above, Applicants believe that the subject invention, as claimed, is neither anticipated nor rendered obvious by the prior art, either individually or collectively, and as such, is patentable thereover.

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Applicants believe that this application, containing claims 1-11, is now in condition for allowance and such action is respectfully requested.

Respectfully submitted,

by _____
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